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SUMMARY

Department of Energy,
New York State Energy Research
and Development Authority

Draft Environmental Impact Statement for Completion of the West Valley Demonstration Project and Closure or Long-Term Management of Facilities at the Western New York Nuclear Service Center

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U.S. Department of Energy
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COVER SHEET

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TITLE: Draft Environmental Impact Statement for Completion of the West Valley Demonstration Project and Closure or Long-Term Management of Facilities at the Western New York Nuclear Service Center.

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ABSTRACT: The purpose of the agency action is compliance by DOE with the statutory requirements of the West Valley Demonstration Project Act by completing the West Valley Demonstration Project and management by NYSERDA of the balance of the site by closing it or bringing it to a condition that reduces the amount of long-term maintenance that will be required. The expected environmental consequences over the implementation phase (about 30 years) and post-implementation phase (about 1,000 years) are evaluated, including analysis of transporting, stabilizing, storing and disposing of wastes generated by decontamination and decommissioning of the West Valley Demonstration Project and by closure or long-term management of facilities at the Western New York Nuclear Service Center. The document analyzes alternatives of no action (monitoring and maintenance), complete removal and off-site disposal, complete removal and storage on premises, in-place stabilization and on-premises disposal, and discontinue operations. Neither DOE nor NYSERDA have identified a preferred alternative.

PUBLIC COMMENTS: Public meetings on the Draft Environmental Impact Statement, will be announced in March 1996; oral comments will be accepted at these meetings. Written comments on the Draft Environmental Impact Statement will be accepted until September 1996 (see Notice of Availability for exact date) at the New York address at West Valley provided above. The U.S. Department of Energy and the New York State Energy Research and Development Authority will consider these public comments in preparing the Final Environmental Impact Statement.

SUMMARY

The Western New York Nuclear Service Center (Center) is a 1,352-ha (3,340-acre) site located 48 km (30 mi) southeast of Buffalo, New York. The New York State Energy Research and Development Authority (NYSERDA) holds title to and manages the Center on behalf of the people of the State of New York. The Center contains a reprocessing facility that operated from 1966 to 1972 and produced approximately 2.3 million L (600,000 gal) of liquid high-level [radioactive] waste. The Center also contains two radioactive waste disposal areas: (1) a 6-ha (15-acre) New York State-licensed disposal area that operated as a commercial low-level [radioactive] waste facility from 1963 to 1975, and (2) a 2-ha (5-acre) U.S. Nuclear Regulatory Commission-licensed disposal area that received radioactive wastes from the reprocessing plant and associated facilities from 1966 through 1986. In addition to the nuclear fuel reprocessing plant and the disposal areas, the Center has a high-level [radioactive] waste tank farm, waste lagoons, aboveground radioactive waste storage areas, and some soil and groundwater contamination in areas near these facilities.

In 1980, Congress enacted the West Valley Demonstration Project (WVDP) Act that required the U.S. Department of Energy (DOE) to demonstrate the safe solidification of liquid high-level [radioactive] waste and transportation of this solidified waste to a geologic repository for permanent disposal. Under this Act, DOE assumed exclusive possession of the 80-ha (200-acre) portion of the Center, referred to as the Project Premises, which includes the former reprocessing facility, the U.S. Nuclear Regulatory Commission-licensed disposal area, the high-level [radioactive] waste tanks, waste lagoons, and aboveground waste storage areas. NYSERDA retained responsibility for the balance of the Center, which includes the New York State-licensed disposal area. DOE and NYSERDA are evaluating alternatives for completing the WVDP and closure beginning in the year 2000 or long-term management of facilities at the Center near West Valley, New York.

This draft Environmental Impact Statement (EIS) discusses alternatives and potential impacts for both off site (the area outside the Center boundary) and on site (the area within the Center boundary). For purposes of analysis, the on-site area is divided into two areas. One of these areas includes the Project Premises [the 80-ha (200-acre) area controlled by DOE] and the New York State-licensed disposal area. The other on-site area is the balance of the site (the area within the Center, excluding the Project Premises and New York State-licensed disposal area).

This EIS evaluates alternatives for integrated sitewide actions to complete DOE decontamination and decommissioning activities and provide for NYSERDA's closure or long-term management of facilities at the Center. The EIS is prepared in accordance with the National Environmental Policy Act and the New York State Environmental Quality Review Act. This joint EIS supports the selection of the site management strategy and gives environmental input for NYSERDA and DOE decisions for future site closure or management activities. DOE and NYSERDA will identify the selected strategy in a Record of Decision and in New York State Environmental Quality Review Act Findings, respectively. If necessary, additional National Environmental Policy Act or New York State

Environmental Quality Review Act documents will be prepared for DOE and NYSERDA actions not specifically addressed in this document.

PURPOSE AND NEED FOR AGENCY ACTION

The purpose of the agency action is compliance by DOE with the statutory requirements of the WVDP Act by completing the WVDP and management by NYSERDA of the balance of the site by closing it or bringing it to a condition that reduces the amount of long-term maintenance that will be required.

ALTERNATIVES CONSIDERED

Five alternatives for WVDP completion and closure or long-term management of the facilities at the Center are analyzed in this EIS. These five alternatives were identified after considering comments received on the Notice of Intent. The five alternatives are

1. Alternative I: Removal and Release to Allow Unrestricted Use

2. Alternative II: Removal, On-Premises Waste Storage, and Partial Release to Allow Unrestricted Use

3. Alternative III: In-Place Stabilization and On-Premises Low-Level Waste Disposal

4. Alternative IV: No Action: Monitoring and Maintenance

5. Alternative V: Discontinue Operations.

Figure S-1 summarizes the alternatives. Alternative II (On-Premises Storage) was identified at public meetings as an alternative for consideration in the EIS. Alternative IV (No Action: Monitoring and Maintenance) is required by National Environmental Policy Act and New York State Environmental Quality Review Act regulations as a benchmark for comparison with the environmental effects of the alternative actions. Alternative V (Discontinue Operations) was also identified at public meetings as an alternative for evaluation in the EIS. Although Alternative V is not considered a reasonable alternative by either agency, it provides an environmental baseline for evaluating impacts. The long-term performance assessment (an analysis of the effects that contaminated facilities would have on human health and the environment over the long term) of Alternative V gives an understanding of the long-term public hazard and contribution of natural processes such as surface water flow or erosion to that hazard.

Table S-1 summarizes the actions for each alternative, including the disposition of newly generated and stored waste.

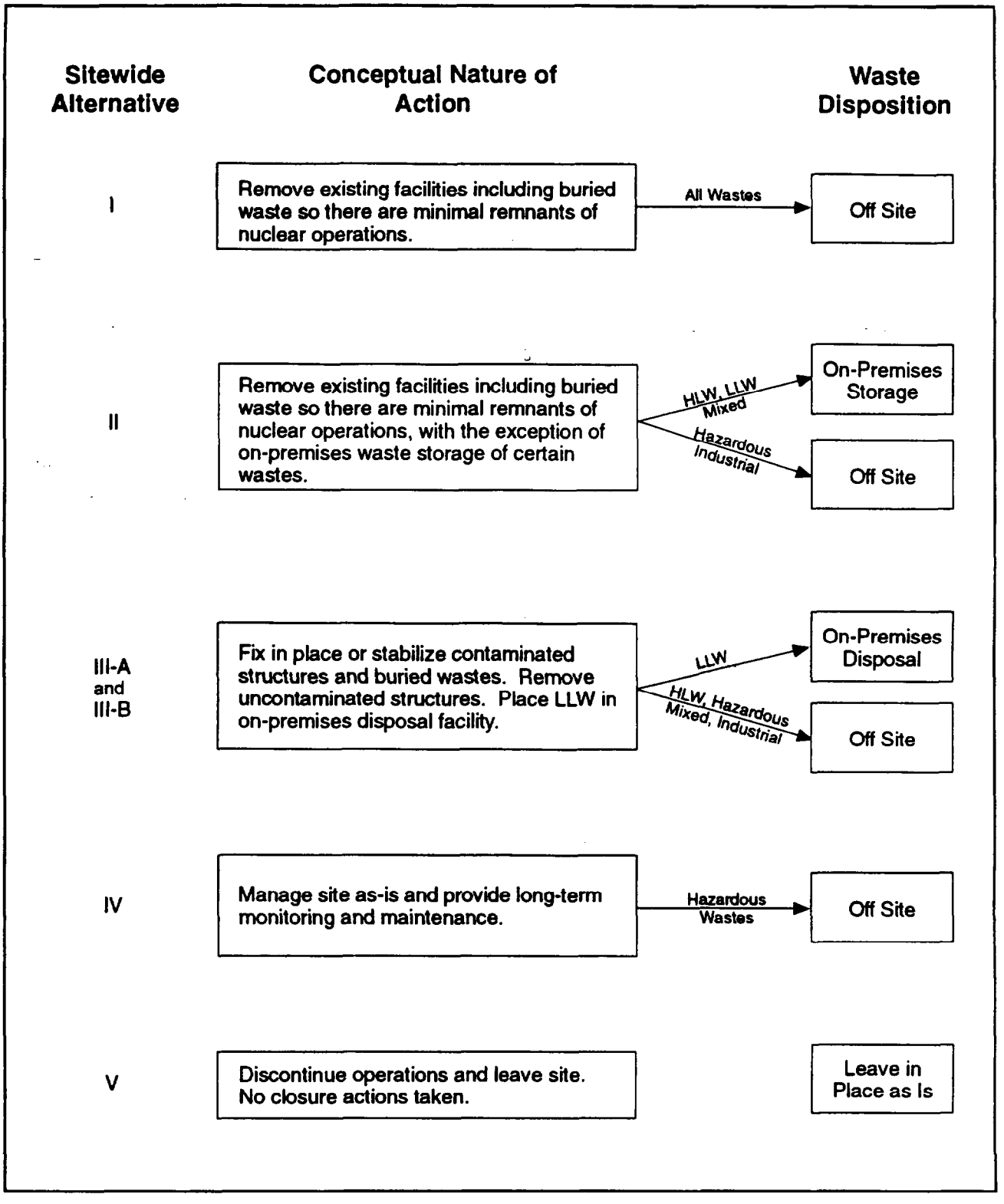

Figure S-1. Alternatives for Completing the West Valley Demonstration Project and Closure or Long-Term Management of Facilities at the Western New York Nuclear Service Center.

Table S-1. Summary of Actions for Alternatives I through V

Alternative I Removal	Alternative II On-Premises Storage	Alternative IIIA In-Place Stabilization (Backfill)	Alternative IIIB In-Place Stabilization (Rubble)	Alternative IV No Action: Monitoring and Maintenance	Alternative V Discontinue Operations
Dismantle buildings	Dismantle buildings	Dismantle buildings except process building and vitrification facility. Backfill process building and vitrification facility with concrete.	Dismantle and remove buildings except process building and vitrification facility. Dismantle abovegrade portions of process building and vitrification facility and install cap on belowgrade portions of these buildings and the building rubble.	Install locks and security systems on buildings. Weld exterior access doors shut.	Shut down facilities' active systems, lock buildings, and leave waste as-is
Remove stored waste and dismantle waste storage facilities	Remove stored waste and dismantle waste storage facilities except RTS drum cell	Remove stored waste and dismantle waste storage facilities except RTS drum cell. Convert RTS drum cell into tumulus.	Remove stored waste and dismantle waste storage facilities except RTS drum cell. Convert RTS drum cell into tumulus.	Not applicable	Not applicable
Pump leachate from disposal areas and exhume buried waste	Pump leachate from disposal areas and exhume buried waste	Pump leachate from NDA and SDA and grout SDA trenches. Install circumferential slurry wall around NDA and SDA and cap them both.	Pump leachate from NDA and SDA and grout SDA trenches. Install circumferential slurry wall around NDA and SDA and cap them both.	Not applicable	Not applicable
Remove in-ground structures	Remove in-ground structures	Backfill HLW tanks with concrete. Cap LLWTF lagoons and SDA filled lagoons. Backfill or remove other in-ground structures.	Backfill HLW tanks with concrete. Cap LLWTF lagoons and SDA filled lagoons. Backfill or remove other in-ground structures.	Excavate sediments from sludge ponds and backfill. Store generated waste on premises. Leave other waste as-is.	Not applicable
Remove remaining facilities, including draining the reservoirs	Remove majority of remaining facilities, including draining the reservoirs	Remove majority of remaining facilities	Remove majority of remaining facilities	Not applicable	Not applicable
Excavate contaminated soil from the Project Premises, SDA, and the balance of the site	Excavate contaminated soil from the Project Premises, SDA, and the balance of the site	Not applicable	Not applicable	Not applicable	Not applicable

Table S-1. Summary of Actions for Alternatives I through V (Continued)

Alternative I Removal	Alternative II On-Premises Storage	Alternative IIIA In-Place Stabilization (Backfill)	Alternative IIIB In-Place Stabilization (Rubble)	Alternative IV No Action: Monitoring and Maintenance	Alternative V Discontinue Operations
Treat contaminated waste, soil, and wastewater in new on-premises container management area. Dismantle container management area after implementation phase.	Treat contaminated waste, soil, and wastewater in new on-premises container management area. Dismantle container management area after implementation phase. Construct new retrievable storage areas.	Treat contaminated wastewater in new wastewater treatment area. Dismantle wastewater treatment area after implementation phase.	Treat contaminated wastewater in new wastewater treatment area. Dismantle wastewater treatment area after implementation phase. Construct new LLW disposal facility.	Not applicable	Not applicable
Stabilize LLWTF lagoon 3 embankment	Stabilize LLWTF lagoon 3 embankment. Stabilize the stream banks along Erdman Brook and Franks Creek.	Either install several localized erosion control structures or implement extensive, sitewide erosion control measures including large-scale stream bed filling	Either install several localized erosion control structures or implement extensive, sitewide erosion control measures including large-scale stream bed filling	Install localized erosion control structures. Stabilize the stream banks along Erdman Brook and Franks Creek.	Not applicable
Dispose of waste off site	Store all radioactive and mixed waste on-premises in new retrievable storage areas. Dispose of industrial waste off site. (RTS drum cell remains.)	Dispose of generated and stored radioactive waste in process building or vitrification facility. Dispose of spent fuel fines and vitrified, mixed, hazardous, and industrial waste off site.	Dispose of generated and stored radioactive waste in new on-premises LLW disposal facility. Dispose of spent fuel fines and vitrified, mixed, hazardous, and industrial waste off site.	Not applicable	Not applicable
Release the Center for unrestricted use	Monitor and maintain the retrievable storage areas, RTS drum cell, Erdman Brook stream banks, and the Franks Creek stream banks south of the RTS drum cell and east of the SDA	Monitor and maintain the remaining facilities and erosion control measures on Erdman Brook, Franks Creek, and Quarry Creek (local erosion control strategy only)	Monitor and maintain the remaining facilities and erosion control measures on Erdman Brook, Franks Creek, and Quarry Creek (local erosion control strategy only)	Inspect, monitor, and maintain all areas of the Center	Personnel leave the Center

HLW = high-level [radioactive] waste
LLW = low-level [radioactive] waste.
LLWTF = low-level waste treatment facility
NDA = Nuclear Regulatory Commission-licensed disposal area
RTS = radwaste treatment system
SDA = New York State-licensed disposal area

The evaluations of impacts of alternatives cover two periods of time: an implementation phase and a post-implementation phase. The implementation phase refers to the period of time it takes to remove or stabilize facilities and the post-implementation phase refers to the subsequent period, which includes long-term monitoring and maintenance for Alternatives II (On-Premises Storage), III (In-Place Stabilization), and IV (No Action: Monitoring and Maintenance). Table S-2 shows the duration of the implementation phase, whether there is a long-term post-implementation monitoring and maintenance period, and new facilities that would be constructed. The labor requirements and waste volumes to be managed, which indicate the effort in implementing the alternatives, are also shown in Table S-2.

As shown in Table S-2, Alternatives I (Removal) and II (On-Premises Storage) involve the greatest effort because the buried waste would be exhumed, the stored waste would be removed, facilities would be decontaminated and demolished, and soil contaminated above assumed contaminant cleanup levels would be excavated. A new facility, the container management area, would be constructed to treat waste, soil and wastewater and to package the stored and newly generated waste. The major difference between these two high-effort alternatives is the disposition of the waste. Under Alternative I (Removal), waste would be disposed of off site, while under Alternative II (On-Premises Storage), the radioactive and mixed waste would be placed into new retrievable storage areas on the Project Premises.

The in-place stabilization alternatives [Alternatives IIIA (Backfill) and IIIB (Rubble)] involve stabilizing the waste, controlling contamination, and managing facilities in-place, and these alternatives would require less effort than Alternatives I (Removal) and II (On-Premises Storage). A new wastewater treatment area would be constructed under both alternatives to treat contaminated liquids. The distinguishing difference between these in-place stabilization alternatives is the treatment of the process building, vitrification facility, and the stored waste in the lag storage building, lag storage additions, and chemical process cell waste storage area. Under Alternative IIIA [In-Place Stabilization (Backfill)], the stored waste would be placed in either the process building or the vitrification facility, which would be backfilled with concrete to convert the building and the waste into a monolith. Under Alternative IIIB [In-Place Stabilization (Rubble)], stored waste would be placed in a new on-premises LLW disposal facility while the process building and the vitrification facility would be demolished within a single, newly-constructed confinement structure. The result of Alternative IIIB would be a grouted pile of building rubble covered by an engineered cap to minimize water infiltration.

Alternative IV (No Action: Monitoring and Maintenance) would involve minimal initial effort to prepare for long-term monitoring and maintenance of the facilities and of the buried and stored wastes. Alternative V (Discontinue Operations) would involve no effort. Facilities would be shut down and personnel would abandon the site.

Alternatives II, IIIA, IIIB, and IV implement erosion controls. Under Alternative III (In-Place Stabilization), either several localized erosion control structures could be installed (e.g., diversion dikes and water control structures) or extensive sitewide, global erosion

Table S-2. Summary of Resource Requirements and Waste Volumes

	Alternative I Removal	Alternative II On-Premises Storage	Alternative IIIA In-Place Stabilization (Backfill)	Alternative IIIB In-Place Stabilization (Rubble)	Alternative IV No Action: Monitoring and Maintenance	Alternative V Discontinue Operations
Implementation Phase Duration (years)	26	28	10[a] or 14[b]	26	5	0[c]
Post-Implementation Phase Monitoring and Maintenance	No	Yes	Yes	Yes	Yes	No
New Facilities	Volume reduction, soil treatment and wastewater treatment (all in container management area)	Volume reduction, soil treatment and wastewater treatment (all in container management area) and waste storage facilities (retrievable storage areas)	Wastewater treatment	Wastewater treatment, LLW disposal facility, and confinement structure for dismantling process building and vitrification facility	Wastewater treatment	None
Labor for Implementation Phase (worker-years)	14,433	18,864[a]	2,071[a] or 2,627[b]	5,634[a] or 6,190[b]	131	0
Direct Employment Levels						
• Peak for Implementation	850	1,026	327	504	24	0
• Level During Monitoring and Maintenance	0	30	50	50	200	0
Waste Volumes Managed During Implementation Phase (ft^3)						
• LLW: A, B, C	4,820,000	4,610,000	510,000	555,000	15,200	0
• LLW: Greater-Than-Class C	272,000	272,000	15,100	15,100	0	0
• HLW[d]	10,600	10,600	9,420	9,420	0	0
• Hazardous	5	2	2	2	1	0
• Mixed	1,810	1,810	2,220	2,220	0	0
• Contaminated Soil	4,230,000[e]	4,230,000[e]	0	0	0	0
• Industrial[f]	5,130,000	4,080,000	1,440,000[a] or 2,410,000[b]	1,420,000[a] or 2,400,000[b]	212,000	0
Total Cost ($1996, thousands)						
Implementation Phase	8,300,000	3,700,000	400,000[a] or 510,000[b]	990,000[a] or 1,100,000[b]	17,000	0
Post-Implementation Phase ($1996 thousands/year)	0	2,800	11,000	11,000	30,000	0

HLW = high-level [radioactive] waste
LLW = low-level [radioactive] waste

a. Assumes local erosion controls would be used.
b. Assumes global, sitewide erosion controls would be used.
c. There would be on-site personnel completing WVDP HLW solidification until the year 2004. No initiatives for completing the WVDP or closing facilities on the Center would be taken.
d. Volumes include the spent fuel fines in the process building. Although the classification of the spent fuel fines is not yet known, for purposes of analysis it was assumed that it would be HLW.
e. Estimated as 25 percent of the original volume of contaminated soil (20 percent that could not be successfully treated and 5 percent that would be contaminated sludge from soil treatment operations).
f. For purposes of analysis, this EIS assumes that this uncharacterized waste would be industrial waste. However, if all of this waste was found to be contaminated during closure activities instead of uncontaminated (as assumed in this table), there would be no industrial waste and these volumes would be Class A waste.

control measures could be implemented, including constructing a new diversion channel and filling stream beds. As shown in Table S-2, the labor requirements would increase if a global erosion control strategy were selected where the drainage pattern of the Project Premises and New York State-licensed disposal area is modified. Erosion control would not be implemented either under Alternative I (Removal), because the waste would be removed from the Center, or under Alternative V (Discontinue Operations), because for analysis purposes, it was assumed that the Center is abandoned.

At this time, neither DOE nor NYSERDA have identified a preferred alternative for completing the WVDP or for closure or long-term management of facilities at the Center, but a preferred alternative will be identified in the final EIS after comments on the draft EIS are considered.

Table S-2 also summarizes the estimated waste volumes that would be managed under each alternative. The waste volumes are dominated by the low-level radioactive, contaminated soil, and the industrial waste categories. The sources for most of the waste volumes are the large buildings (process building and vitrification facility), the disposal areas (New York State-licensed disposal area and U.S. Nuclear Regulatory Commission-licensed disposal area), and the waste storage facilities (lag storage building and additions and chemical process cell waste storage area). Under Alternatives I (Removal) and II (On-Premises Storage), the waste volumes could increase if soil treatment is not as effective as estimated in the conceptual engineering designs. No bench test or pilot scale evaluations have been performed for site-specific soil treatability. The disposition of these waste volumes under the same alternatives could be affected depending on whether off-site facilities would accept industrial waste generated by the demolition of decontaminated facilities. For Alternatives III (In-Place Stabilization), IV (No Action: Monitoring and Maintenance), and V (Discontinue Operations), the waste volumes to be managed are less than the volumes for Alternatives I and II, either because the facilities are stabilized in place, managed as is, or no action is taken at all.

COMPARISON OF IMPACTS

Direct environmental impacts occur during the implementation phase and vary depending on the alternative. The resources required to implement an alternative; the impacts to the public and workers from routine actions, accidents, and transportation; and impacts to air, water, biotic resources, wetlands and floodplains, cultural resources, and land use are evaluated. The costs and socioeconomic impacts are also evaluated. All impact areas are summarized in Section 3.8 of Chapter 3. The impacts that differentiate among the alternatives are summarized here.

Potential accidents were postulated and evaluated for each of the alternatives. The dose to the maximally exposed off-site individual and to the general population were calculated together with the annual probability of the postulated accident. At least one accident was identified for each alternative that resulted in a dose of 25 rem (25,000 mrem) to a member of the public, although more than half of the postulated accidents would result in a dose of less than 5 rem (5,000 mrem). All of these accidents have an estimated annual

probability of occurring that ranges from one in ten thousand to one in 100 million (10^{-4} to 10^{-8}). These are considered to be bounding estimates of severity and frequency. The range of potential worker doses were also estimated but could not be precisely defined because of the lack of definitive information on facility design and occupancy patterns. The accident analysis is presented in Appendix G and the results are summarized in Chapter 5. The results are not summarized here because they did not discriminate among alternatives.

Implementation of the alternatives could result in fatalities because of radiation exposure (latent cancer fatality) or transportation accidents. Estimates of these fatalities are presented in Table S-3. Fatalities are greater for Alternatives I and II than the other alternatives because the buried waste would be exhumed and buildings would be demolished, which creates the potential for accidents and for more radioactive material being released to the environment.

As shown in Table S-3, Alternative I (Removal) requires off-site disposal of a large volume of radioactive waste. Approximately 21,000 truck shipments or 13,300 rail shipments to an off-site radioactive waste disposal site would be needed. Adverse nonradiological and radiological impacts would result from both the shipping and waste disposal activities. Shipping would result in increased traffic congestion, the potential for nonradiological injuries and fatalities because of traffic accidents, and radiological exposure and the corresponding risk of latent cancer to both the shipping personnel and the public along the shipping routes. Alternatives II (On-Premises Storage) and III (In-Place Stabilization) would ship industrial waste off site, but it would be shipped in smaller volumes than for Alternative I.

As shown in Table S-3, Alternatives I (Removal) and II (On-Premises Storage) result in the largest implementation phase impact on air, biotic resources, and wetlands from disturbing a larger area by demolishing buildings, exhuming buried waste, or removing contaminated soil. Some specimens of a State-Endangered plant species, Rose Pinks, could be destroyed if Alternative I or Alternative II were implemented. Likewise, more forested areas on the balance of the site would be uprooted from implementing Alternative I or Alternative II. However, there are no critical habitats located on the Project Premises and New York State-licensed disposal area, the industrial area where most of the action would be occurring; therefore, impacts to biotic resources in this area would be minimal.

The total disturbed area also depends on the type of erosion control strategy implemented. More land, biotic resources, cultural resources, and wetlands would be disturbed or destroyed if a global erosion strategy were selected.

Implementing Alternative I or Alternative II would destroy or disturb 8.8 ha (21.9 acres) of wetlands. These wetlands are small, generally less than 0.6 ha (1 acre) in size, and do not support critical habitat. DOE and NYSERDA would work with the U.S. Army Corps of Engineers and the New York State Department of Environmental Conservation as appropriate to mitigate impacts to wetlands.

Table S-3. Summary of Impacts During the Implementation Phase

Impact	Alternative I Removal	Alternative II On-Premises Storage	Alternative IIIA In-Place Stabilization (Backfill)	Alternative IIIB In-Place Stabilization (Rubble)	Alternative IV No Action: Monitoring and Maintenance	Alternative V Discontinue Operations
Maximally Exposed Off-Site Individual						
• Annual risk of Latent Cancer Fatality	2.2×10^{-9}	2.2×10^{-9}	1.6×10^{-6}	1.6×10^{-6}	2.9×10^{-7}	No implementation
Fatalities from Site Operations						
• Because of Occupational Industrial Accidents	0.25	0.31	0.13	0.25	0.0035	0
• Latent Cancer Fatality—Occupational	0.5	0.5	0.05	0.05	0.005	No implementation
• Latent Cancer Fatality—Public	0.06	0.06	0.02	0.02	0.001	No implementation
Fatalities from Transportation (Hanford for LLW)						
• Truck Accidents	3.55	0.28	0.22	0.22	0.016	No implementation
• Rail Accidents	3.24	0.26	0.20	0.20	0.006	No implementation
• Occupational Latent Cancer Fatalities—Truck	0.56	0	0.028	0.028	0	No implementation
• Occupational Latent Cancer Fatalities—Rail	0.14	0	0.006	0.006	0	No implementation
• Public Latent Cancer Fatalities—Truck	5.9	0	0.38	0.38	0	No implementation
• Public Latent Cancer Fatalities—Rail	0.69	0	0.029	0.29	0	No implementation
Total Latent Cancer Fatalities (Site Operations and Transportation)					0	
Truck	7.02	0.56	0.48	0.48	0.006	No implementation
Rail	1.39	0.56	0.10	0.10	0.006	No implementation
Number of Waste Shipments (Off Site)						
• Radioactive Waste (Truck)	21,000	0	340	340	0	0
• Radioactive Waste (Rail)	13,300	0	180	180	0	0
• Industrial Waste (Truck)	10,000	8,200	5,000	5,000	500	0
• Industrial Waste (Rail)	7,000	5,700	3,500	3,500	340	0
Area Required at Off-Site Disposal Facilities (acres)	23	0	Negligible	Negligible	0	0
Total Disturbed Area [hectares (acres)]	81 (200)	83[a] (205)	39[a] to 57[b] (97 to 142)	39[a] to 57[b] (97 to 142)	32[a]	0
Wetlands, Disturbed or Destroyed [hectares (acres)]	8.8 (21.9)	8.8[a] (21.9)	1.9[a] or 6.4[b] (4.7 or 20.7)	1.9[a] or 6.4[b] (4.7 or 20.7)	0.6[a] (1.4)	0
Cultural Resources						
• Historic	No impact	No impact	No impact	No impact	No impact	No impact
• Archaeological [hectares (acres)]	3.8 (9.5)	3.8[a] (9.5)	3.8[a,c] (9.5)	3.8[a,c] (9.5)	No impact[a]	No impact
Dedicated Area [hectares (acres)]	0	340 (830)	350 (860)	350 (860)	1,350 (3,340)	47 (115)
Socioeconomic impact in the Region of Influence from combination of implementing the alternative and decline in employment from WVDP HLW solidification operations	Gradual decrease in direct site employment from current level of 950 to 850 in 2011 and then decrease to zero in 2026. Decrease would occur over 15 years and would cause loss of about 57 direct jobs/year.	Increase in direct site employment from current level of 950 to 1,026 in 2011 and then gradually decrease to stable level of 30 in 2026. Decrease would occur over 15 years and would cause loss of about 67 direct jobs/year.	Decrease in direct site employment from current level of 950 to stable level of 90 in 2011. Decrease would occur over 11 years and would cause loss of 82 direct jobs/year.	Decrease in direct site employment from current level of 950 to stable level of 90 in 2027. Decrease would occur over 27 years and would cause loss of 33 direct jobs/year.	Decrease in direct site employment from current level of 950 to stable level of 187 by 2004. Decrease would occur over 4 years and would cause loss of 190 direct jobs/year.	Decrease in direct site employment from current level of 950 to zero by 2004 from completion of HLW solidification. Decrease would occur over 4 years and would cause loss of 237 direct jobs/year.

HLW = high-level [radioactive] waste
LLW = low-level [radioactive] waste
WVDP = West Valley Demonstration Project
a. Assumes local erosion controls would be used.
b. Assumes global, sitewide erosion controls would be used.
c. More area may be disturbed if global erosion controls were used.

No historic structures are located on the Project Premises, New York State-licensed disposal area, or balance of the site; therefore, there would be no impact to historic cultural resources in these areas. No known archaeological resources are located in areas to be disturbed on the Project Premises and New York State-licensed disposal area; therefore, there would be no impact. Areas with the potential for prehistoric archaeological sites could be disturbed on the balance of the site.

The dedicated land area resulting from implementing the alternatives would range from 0 to a maximum of 1,352 ha (3,340 acres) depending on the alternative. Under Alternative I (Removal), the Center would be released to allow unrestricted use. Under Alternative IV (No Action: Monitoring and Maintenance), the Center is monitored and maintained. Under Alternatives II (On-Premises Storage) and III (In-Place Stabilization), about one fourth [340 — 350 ha (830 — 860 acres)] of the acreage on the Center would be restricted to accommodate buffer zones and erosion control measures.

The WVDP currently accounts for about 6 percent of the employment in a 20-km (12-mi) radius from the Center, and all alternatives would ultimately eliminate most, if not all, of these jobs. The elimination of jobs would occur slowly over an extended period of time with the exception of Alternative V (Discontinue Operations). Alternative I or Alternative II defers this job reduction for about 20 years. The in-place stabilization alternatives (Alternatives IIIA and IIIB) defer this reduction for 10 or 26 years depending on the selected technology. Under Alternative IV (No Action: Monitoring and Maintenance), a maintenance and monitoring staff would remain. No noticeable influx of personnel would result from implementing any of the alternatives. The current site employees would be expected to fill most of the jobs associated with the alternatives.

Impacts to the population are measured in latent cancer fatalities that could result from radiation exposure. Two populations were evaluated in this EIS: those people residing within a 80-km (50 mi) radius of the site and those people along the transportation routes as summarized in Table S-3. All alternatives would result in less than one additional latent cancer fatality to the general population from site operations during the implementation phase.

The results of the transportation analysis shows that if all of the waste were shipped off site (Alternative I, Removal), the latent cancer fatalities could potentially be about 6 (5.9 on Table S-3) if the waste were shipped by truck. The number of latent cancer fatalities would be about 15 times less (0.38) if the waste were shipped by rail instead. The number of latent cancer fatalities from shipping radioactive waste under Alternatives II (On-Premises Storage), III (In-Place Stabilization), and IV (No Action: Monitoring and Maintenance) would be zero or less than one either because no radioactive waste would be shipped (Alternatives II and IV) or a much smaller volume of radioactive waste would be shipped (Alternative III).

Even though DOE expects little or no adverse health impacts from any of the alternatives assuming institutional control is maintained, it analyzed whether or not there would be "disproportionately high and adverse human health or environmental effects on

minority populations or low-income populations" (Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations"). To estimate health impacts to the Seneca Nation, the EIS includes in Section 5.8.2.4 an analysis based on fish consumption rates from the Mohawk Indians and Environmental Protection Agency guidance. DOE does not have information on Seneca Nation fish consumption, but is consulting with the Seneca Nation on this issue. The final EIS will include results of that consultation and any conclusion that DOE has reached based on the Seneca Nation-specific information.

The impact assessment shows the implementation phase environmental impacts are largest for Alternatives I and II because more area would be disturbed to remove contamination. The extent of these impacts is indicated by the acres disturbed, the labor requirements, the number of shipments, and the required area for new storage facilities. The implementation phase impacts are less for Alternatives IIIA and IIIB, depending on the selected erosion control strategy. The streams on the Project Premises are drastically changed if the global erosion control strategy is implemented. The least implementation phase impacts are from Alternative IV (No Action: Monitoring and Maintenance), where minimal area is disturbed and minimal labor is required to implement the alternative.

Table S-4 summarizes the results of the long-term radiological performance assessment, an analysis of the effects that contaminated facilities would have on human health and the environment over the long term. The results from three cases are presented: the expected case that assumes institutional control is maintained (for 100 years), a loss of institutional control case assuming only a Buttermilk Creek intruder, and loss of institutional control assuming there is an intruder on either the Project Premises or the New York State-licensed disposal area. The dominant pathway (i.e., groundwater, surface water, or erosion) along with the expected radiation dose in the peak year of maximum impact is shown on Table S-4.

The dose estimates, including those for the expected case, are biased high. They are based on conservative radionuclide release and transport estimates and on air, water, and soil use assumptions that overestimate the results. For any one pathway (e.g., air, water, or soil) 10 to 20 factors may be evaluated to determine a potential dose (including water infiltration rate, radionuclide solubility, radionuclide adsorption onto soil, groundwater velocity, dilution by ground and surface waters, source of drinking water, and source of irrigation water, source of and amount of food consumed). The cumulative effect of these conservative biases could overestimate the dose by factors ranging from 2 or 3 to factors greater than 10. The cumulative biases are even greater for the scenarios evaluated for loss of institutional control where there is the increased potential for groundwater releases or erosional collapse into streams. Given these conservative biases, the analytical results from long-term performance are most useful for comparing the alternatives and for identifying the potential sources (e.g., high-level [radioactive] waste tanks or low-level waste treatment facility) or pathways (e.g., groundwater or erosion) that contribute to the dose. The conservative biases make it difficult to accurately predict if a particular dose standard (e.g., 25 mrem/yr) would be exceeded. If, however, the analysis indicates the dose would be less than a particular standard, there is high likelihood the standard would not be exceeded.

Table S-4. Summary of Post-Implementation Phase (Long-Term) Peak Doses[a]

Receptor	Alternative I Removal (mrem)	Alternative II On-Premises Storage (mrem)	Alternative IIIA In-Place Stabilization (Backfill) (mrem)	Alternative IIIB In-Place Stabilization (Rubble) (mrem)	Alternative IV No Action: Monitoring and Maintenance (mrem)	Alternative V Discontinue Operations (mrem)
Maintenance of Institutional Control[b]						
Off-Site Resident (Cattaraugus Creek)	<< 15	<< 15	72 (HLW tanks)	72 (HLW tanks)	1.2 (LLWTF)	5,600 from groundwater flow from HLW tanks through sand and gravel layer; 560 to 41,000 from erosion-induced releases from NDA and SDA to surface water
Off-Site Person of the Seneca Nation [24 km (15 mi) Downstream on Cattaraugus Creek at the Cattaraugus Reservation][c]	<< 15	<< 15	126 (HLW tanks)	126 (HLW tanks)	2.2 (LLWTF)	9,800 from groundwater flow from HLW tanks; 980 to 72,000 from erosion-induced releases from NDA and SDA to surface water
Loss of Institutional Control						
Intruder Buttermilk Creek	<< 15	652 (RSAs degradation) 4,500 (RTS drum cell)	541 (HLW tank failure); 4,500 to 280,000 from erosion-induced releases from RTS drum cell, NDA, and SDA	541 (HLW tank failure); 4,500 to 280,000 from erosion-induced releases from RTS drum cell, NDA, and SDA	4,700 (HLW tank failure); 4,500 to 280,000 from erosion-induced releases from RTS drum cell, NDA, and SDA	45,000 (HLW tank failure); 4,500 to 330,000 from erosion-induced releases from RTS drum cell, NDA, and SDA
Intruder to Project Premises and SDA	< 15	130,000,000 (RSAs)	89,000,000 (HLW tanks)	89,000,000 (HLW tanks)	1,100,000,000 (HLW tanks)	9,200,000,000 (HLW tanks)

< = less than
<< = much less than
HLW = high-level [radioactive] waste
LLWTF = low-level waste treatment facility
SDA = New York State-licensed disposal area
NDA = Nuclear Regulatory Commission-licensed disposal area
RTS = radwaste treatment system
RSAs = retrievable storage areas

a. Impacts are from surface water and groundwater pathways.
b. Referred to as the "expected conditions" case in Volumes I and II of the EIS.
c. Dose calculations for Seneca Indians assumes consumption of, and crop irrigation with, Cattaraugus Creek water and a high rate of consumption of Cattaraugus Creek fish.

Long-term performance analysis under expected conditions shows that for Alternatives II (On-Premises Storage) and IV (No Action: Monitoring and Maintenance) the dose to the maximally exposed off-site individual would be less than 25 mrem/yr. The off-site dose to the maximally exposed individual under expected conditions would be greater than 25 mrem/yr under Alternatives IIIA [In-Place Stabilization (Backfill)] and IIIB [In-Place Stabilization (Rubble)] because of potential releases from the high-level [radioactive] waste tanks. The high-level [radioactive] waste tanks contribute to this higher dose because of the tank inventory and the waste form (a concrete-sludge mixture). The conceptual engineering design for the inventory and waste form was developed before the long-term performance assessment was completed. Modifying the conceptual engineering design under this alternative could reduce the waste inventory, improve the waste form, or provide for selective removal of the high-level [radioactive] waste tanks. For Alternative IV (No Action: Monitoring and Maintenance), the high-level [radioactive] waste tanks perform better than Alternative III (In-Place Stabilization) because they would be maintained.

The long-term radiological performance assessment also evaluated the impact of potential intruders that could enter the site if there was loss of site control and loss of maintenance of creek banks next to the facilities (loss of institutional control). This analysis showed doses for the Buttermilk Creek intruder that exceed 25 mrem/yr. The peak doses are expected to occur 60 to 70 years after loss of institutional control for potential releases from facilities on the Project Premises and New York State-licensed disposal area that are not eroded. For potential releases from facilities on the Project Premises and New York State-licensed disposal area that are eroded, the peak doses occur 200 to 300 years after loss of institutional control if a local erosion control strategy is implemented and after 1,000 years if a global erosion control strategy is implemented. Alternative II (On-Premises Storage) would be less susceptible to erosion than Alternatives IIIA, IIIB, and IV if the retrievable storage areas were located in areas less likely to erode or if the facility was specifically designed to withstand the effects of the till erosion. Alternatives IIIA, IIIB, and IV appear to have comparable impacts from erosion because the material that can be eroded is in the same place. The potential impact can be reduced by implementing the erosion control strategies.

Finally, the long-term radiological performance assessment examined the impact of potential intruders on the Project Premises and the New York State-licensed disposal area following loss of institutional control. This analysis showed large doses (greater than 500 mrem) for most of the remaining waste management areas under Alternatives II through V. The large doses result from managing the waste in a concentrated form and are not specific to the waste or the Center. All alternatives are susceptible to intrusion, and there is no basis for concluding that any alternative is less prone to intrusion than another. The results of the analysis demonstrate the necessity of institutional control to limit site access under Alternatives II through IV.

The maximum long-term radiological impact after implementation of Alternative I (Removal) to a potential reuser of the Project Premises and New York State-licensed disposal area would be 15 mrem/yr. This level has been proposed as a radiological cleanup criteria in draft regulations prepared by the U.S. Nuclear Regulatory Commission and the U.S. Environmental Protection Agency.

The expected long-term impacts of disposing of the waste off site [Alternative I (Removal)] would likely be less than those presented for the on-premises disposal alternatives because more favorable water and soil conditions at the disposal site would enhance isolation of the waste from the environment. The long-term impacts from loss of institutional control and site maintenance at the selected disposal site would also be expected to be less than those presented for alternatives where waste would remain at the Center. The reduced dose would result from improved soil and water conditions, a more stable site, and engineered features of the disposal facility to limit migration from and intrusion into the waste.